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ABSTRACT

This government document presents a report of the Committee on Public Works, United States Senate, ninety-second Congress, regarding bill S. 1113, the National Environmental Center Act of 1971. The bill, originally introduced as the National Environmental Laboratory Act of 1971 provides for the establishment of a parent agency, the National Environmental Center (NEC), and regional national environmental laboratories (NEL). Committee amendments suggest the research program of NEC be directed toward a universal view of the environment, thus, any comprehensive research effort must match the scope of the problem. A specific mandate was made to carry on training and education jointly with and through other institutions, universities, and colleges. Also, an amendment provides that the Center be located and operated in a manner to avoid overlap and conflict with existing private and public research organizations activities. The report includes a summary of committee amendments, a statement of need (studies supporting the establishment of national environmental laboratories), estimated cost of the legislation, changes in existing law, roll call votes, departmental reports (from various departments and agencies during Committee hearings), section by section analysis of the bill, and appendix (summary of agency responses to letter of inquiry on federal research in environmental science and technology). (BL)

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Calendar No. 504

92D CONGRESS
1st Session

SENATE

REPORT
No. 92-518

NATIONAL ENVIRONMENTAL CENTER ACT OF 1971

REPORT

OF THE

COMMITTEE ON PUBLIC WORKS
UNITED STATES SENATE

TO ACCOMPANY

S. 1113

(II)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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NOVEMBER 30 (legislative day, NOVEMBER 29), 1971.—Ordered to be printed

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NOTE

(As originally introduced, S. 1113 was entitled the "National Environmental Laboratory Act of 1971." The bill provided for the establishment of a parent agency, to be known as the National Environmental Laboratory (NEL) and for the establishment of regional national environmental laboratories (NEL's). The committee concluded that this nomenclature would give rise to unwanted confusion and decided to name the parent agency the National Environmental Center (NEC). Laboratories established under the aegis of the NEC would still be called national environmental laboratories (NEL's). Because the testimony on which this report is based was taken on the bill as originally titled, the term National Environmental Laboratory (NEL) is frequently used in the report to denote both the parent organization—now called the National Environmental Center in the amended bill—and the regional laboratories. The context in which the term National Environmental Laboratory appears should make clear whether it refers to the parent organization located at the seat of Government or to the laboratories that would be established pursuant to section 5 of the bill.)

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SENATE

REPORT
No. 92-518

NATIONAL ENVIRONMENTAL CENTER ACT OF 1971

NOVEMBER 30 (legal day, NOVEMBER 29), 1971.--Ordered to be printed

Mr. BAKER, from the Committee on Public Works, submitted the following

REPORT

[To accompany S. 1113]

The Committee on Public Works, to which was referred the bill (S. 1113), the National Environmental Center Act of 1971, having considered the same, reports favorably thereon, with amendments, and recommends that the bill as amended do pass.

GENERAL STATEMENT

The industrial revolution of the last century marked a major turning point in the economic and social history of man's existence. The invention and application of mechanized processes, the division and specialization of labor, the harnessing of new forms of energy, and the utilization of natural resources opened new vistas of economic prosperity. The industrial and technological revolutions have produced—particularly in the Western nations—a remarkably high material standard of living. And the exponential expansion of economic growth has assumed a degree of inevitability.

It became apparent to many—even during its early stages—that this period of unprecedented expansion would not be without its social costs. Dickens and scores of others chronicled the squalid social conditions and labor abuses that frequently characterized urbanized industrial centers and factory towns. Progressive governments undertook efforts to remedy some of the more egregious wrongs that had sprung up in the wake of rapid change. Affirmative legislative acts and the evolution of the common law have increasingly worked to expand and protect the rights of individuals and groups within the framework of a mixed free enterprise economy.

It was not until the decade of the 1960's, however, that the world's industrialized nations began to develop a widespread awareness of the impact of man's activities on the natural environment. Billowing

smokestacks—long a symbol of human progress—became a symbol of environmental abuse. Air and water—long treated by the economic system as "free" commodities—began to assume an increasing value.

As public concern about environmental degradation grew, so did the demand for action. During the last decade, the Congress enacted a number of important environmental statutes designed to control and abate various types of insults to segments of the environment, e.g., air pollution, solid waste disposal, pollution of the navigable waterways and the oceans. Although much remains to be done in each of these areas, an important and meaningful beginning has been made.

But it has become increasingly apparent that, in the long term, an intelligent relationship between man and his natural environment can only be achieved through a systematic approach. The global ecosystem is precisely that: a system. In this enormously complex network, each subsystem, however subtly, is interconnected with all others. Any action that impacts on one element of the environment can have a discernible effect on seemingly unrelated elements of the same fundamental system. It is not enough, then, to treat air pollution and water pollution as if they were discrete and separable problems. To use a gross example, it has been estimated that as much as 40 percent of the surface pollution of the oceans derives not from the discharge of pollutants directly into the aquatic environment but from the precipitation of air pollutants.

A number of Federal agencies are presently engaged in important research that relates, in varying degrees, to environmental considerations. Examples are the Environmental Protection Agency, the Department of the Interior, the National Aeronautics and Space Administration, the Department of Agriculture, the Department of Housing and Urban Development, the Department of Health, Education and Welfare, the National Science Foundation, and the Atomic Energy Commission. The contribution of these and other public and private research efforts will continue to be of major significance.

But virtually all efforts of this type are necessarily directed to a limited aspect of the environmental problem. This is the expected and appropriate function of a mission-oriented or regulatory agency. It is natural, for example, that the research carried out by the Water Quality Office of EPA should focus on the most immediate problems associated with water pollution, or that the research of the Department of Agriculture should be concentrated on land conservation and practices related to the productive use of agricultural and forest lands.

During the course of its many hearings and investigations on environmental matters over the past 8 years, the Subcommittee on Air and Water Pollution and the Committee on Public Works have repeatedly taken notice of the absence of any single public or private unit with the mandate and the resources to conduct systematic, interdisciplinary research on matters relating to the global environment. The Committee proposes to remedy this perceived deficiency—at least in part—through the establishment of the National Environmental Center and constituent laboratories. As the text of the bill clearly states, the National Environmental Center is not intended to supplant in any way the necessary activities of existing public and

private agencies but, rather, to compiement those agencies; to provide a process whereby the entire range of environmental research, analysis, and to assure that an assessment can be brought together and viewed as a coherent, systematic whole.

The interdisciplinary nature of the National Environmental Center can scarcely be exaggerated. In assessing the impact of man's activity on the environment, no single discipline can possibly anticipate the full range of effects that any single action or group of actions may have. It is expected that the National Environmental Center would draw on the broadest spectrum of professional competence: physical scientists, economists, lawyers, business executives, agronomists, demographers, sociologists, and historians, to name a few. And the work of these men and women would not be *multi*disciplinary but *inter*disciplinary, that is, a maximum effort must be made for coordination among various disciplines, so that aspects of a given environmental consideration which might escape the notice of one would be embraced by another.

A readily comprehensible example of the kind of question which would lend itself to this sort of interdisciplinary exploration is that of alternative modes of transportation. The decision by a medium-sized city to proceed with a mass-transit system will send ripples out through that community and throughout the society and the economy. If electrically-powered underground transit is selected, regional demands for electrical energy will be affected. In meeting the need for energy, utilities will demand alternative fuel sources which may cause mining coal that may devastate the surface of a distant mountain or a new drain on limited natural gas supplies, or the construction of a nuclear facility with its relatively high waste heat component. The selection of the routes for such a subway system will determine land use, living and employment patterns for years to come. The construction of the system itself requires the commitment of financial, material, and human resources that will affect surrounding markets.

Man-made degradation of the natural environment is not ordinarily malicious; it is the unwanted by-product of the full range of man's search for a richer and fuller life. There is every evidence that economic progress and a quality environment can be made compatible. But precisely because the full range of man's economic and social activity is involved, and precisely because the global ecosystem is a system and not a random collection of separate parts, no quest for harmony between man and his environment is likely to be successful unless it proceeds on a systematic and integrated basis.

SUMMARY OF COMMITTEE AMENDMENTS

Section 1

The committee would amend the bill introduced by changing the name from the National Environmental "Laboratory" to the National Environmental "Center". This change is proposed to avoid confusion which might result with existing research facilities called "National Laboratories." This change also conveys the fact that the parent National Center will serve as an umbrella for laboratory facilities which would be established by the Center's Board of Trustees.

Section 2

The committee bill refines the Statement of Findings and Declarations to assure that the research program of the National Environmental Center is directed toward a universal view of the environment. The committee's experience with water, air, and solid waste pollution clearly indicates that the problems of environmental quality are global. Consequently, any comprehensive research effort must match the scope of the problem. The committee amendment to the Statement of Findings and Declarations includes a specific mandate to the National Environmental Center to carry on training and education jointly with and through other instituttions, universities, and colleges. The committee amendment provides that the Center be located and operated in a manner to avoid overlap and conflict with existing private and public research organizations activities.

Section 3

No substantive change.

Section 4

The committee amendment would change the composition of the Board of Trustees of the National Environmental Center. When introduced, S. 1113 provided four of the members of the Board would be ex officio appointees from Federal agencies. The committee believes that ex officio members from Federal agencies could not carry out the functions of the Board without potential conflict with their own research programs. In addition, such members would be unable personally to participate and would delegate the membership to subordinates which would further frustrate the proper execution of duties by the Board. Consequently, the committee amendment provides that the Board of Trustees shall be appointed exclusively from the general public, by and with the advice and consent of the Senate. The amendment provides for a Board composed of seven such public members. Not more than four of any such members could be members of the same political party. This change further represents the strong desire of the committee that the National Environmental Center be independent of the several agencies of the Federal Government, partisan politics, and private interest groups.

The committee amendments adds a new subsection to section 4 to provide an advisory committee from the general public to advise the

Board of Trustees on scientific and policy matters relating to environmental research and development. The committee believes it is necessary to establish formally a vehicle for the continuous interchange of information between members of the Board and members of the public.

The committee amendments would also establish a Federal agency liaison committee consisting of representatives of appropriate Federal agencies. This would assure that Federal agencies be kept fully and currently informed of all activities of the National Environmental Center, and that the Center be kept advised of all the activities of the Federal agency which relate to the activities of the Center. The committee believes this liaison committee would assure coordination and cooperation of Federal agencies with the National Environmental Center.

Section 5

The committee recommends that the number of subordinate laboratory units in the National Center be increased from four to six. Six units are needed to apply adequate resources and manpower to the research program required under the bill. In addition, the bill provides that the Board could not establish the location of any constituent laboratory until such location had been approved by the appropriate committee of the House of Representatives and the Committee on Public Works of the Senate.

The committee amendment adds new language to section 5 to provide specific authority for the Board to establish formal affiliation with existing private and public organizations and agencies. The committee believes that the Center should integrate and draw upon, to the extent possible, environmental research capabilities of existing private and public agencies and groups rather than unnecessarily duplicate resources and personnel.

The committee amendment also adds a requirement that the Board direct the Center to make publicly available and disseminate information concerning its activities, and results thereof, so that the public may gain wider understanding of environmental issues. The committee believes that one of the primary functions of the Center will be the generation and distribution of information upon which the public, elected representatives, and appointed officials can make sound decisions.

The committee bill does not describe or prescribe the specific research programs, or areas of interest, for either the National Environmental Center or its constituent laboratories. However, the committee bill does provide general direction to the Board concerning the environmental problems and the scale and scope of such problems which it expects the Center and its laboratories to address. The committee believes that the Board should be given discretion to review existing facilities and activities and, subject to approval by the appropriate committees of Congress, make judgments on the location and character of the constituent laboratories so as to maximize the utilization of existing facilities and personnel.

7/8

Section 6

No substantive change.

Section 7

No substantive change.

Section 8

No substantive change.

Section 9

The committee has added the specific requirement that the Board must submit to the Committees on Appropriations of the House of Representatives and the Senate a statement of the expenditure of all funds available as a result of the revenue produced by the management of the special trust fund created under section 9. The committee is concerned that, while the bill as introduced did permit the investment in the special trust fund to Federal securities, expenditures from the fund did not receive any scrutiny. The submission of statements should assure wise management and appropriate congressional review.

The committee reduced the amount of authorization of appropriations for the operation of the Center and its constituent laboratories from $200 million a year for each constituent laboratory, to a total of $40 million for fiscal year 1972, and $80 million for fiscal year 1973. The committee believes these figures more accurately represent the cost of establishing the Center and its constituent laboratories and carrying out the activities of the Center and the laboratories through the early growth stages. The committee has limited the authorization for 2 fiscal years so that a more accurate judgment upon cost can be made after the initial development of the Center.

Section 10.

No substantive change.

Section 11.

The committee has added a new section which would authorize the Comptroller General of the United States to study and assess the research, pilot, and demonstration programs related to the environmental quality which are conducted by all Federal agencies. Information provided the committee (see Appendix A) indicates a great deal of potential for duplication of research and development. More importantly, the committee believes diffusion of environmental research capabilities throughout numerous agencies will result in inadequate research.

The National Environmental center and its constituent laboratories may be a more logical location for these personnel and the research activities. Not only could such concentration of capability save considerable public funds, but more fruitful research programs could be carried out.

The General Accounting Office study provided by the bill should indicate the value of elimination of duplication and should include recommendations for any necessary legislative changes to facilitate needed reorganization.

STATEMENT OF NEED

Studies Supporting the Establishment of National Environmental Laboratories

A widespread consensus has emerged in the past two years, from a variety of independent sources, on the need for a new, national institutional structure to focus comprehensive research on environmental problems. Four major studies have contributed detailed evidence supporting the establishment of National Environmental Laboratories:

(1) "Institutions for Effective Management of the Environment" by the Environmental Studies Board of National Academy of Sciences—National Academy of Engineering, 1970;

(2) "Environmental Science—Challenge for the Seventies" by the National Science Board, 1971;

(3) "The Case for National Environmental Laboratories"*, 1970 Ad Hoc NEL Concept Committee, Oak Ridge National Laboratory, (and a volume of comments on this proposal compiled by the Committee on Public Works, 1971); and

(4) "Current Research by Federal Agencies and Organizations on Environmental Science and Technology," a volume compiled and analyzed by the Staff of the Subcommittee on Air and Water Pollution, Senate Committee on Public Works, 1971*.

From different starting points and with personnel representing different backgrounds, each of these studies converged on similar recommendations.

The NAS–NAE study based on extensive literature reviews, interviews and consultations with scientists concluded:

> A National Laboratory is one of the major components we believe necessary to meet the Nation's needs for environmental research * * *. The National Laboratory for Environmental Science should be responsible for basic and applied research with the following objectives: (1) Analysis of the interaction of environmental factors, leading to (2) Development of the capacity to predict environmental changes, and thus (3) Development of the capacity to maintain, modify, restore, improve, and generally manage the environment.
>
> In order to work effectively toward these objectives the laboratory will need a sizable research staff, laboratory facilities, and special supporting staff and equipment for environmental expeditions and field experiments. Part of the analysis of environmental factors would be based on the vast body of data to be acquired through the monitoring activities of the Federal government.

The National Science Board, the chief science policy advisor in the Federal Government, based its report, in large part, on the contribu-

*Available from Senate Committee on Public Works on request.

tions of more than 150 scientists, representing a significant sample of the intellectual leadership in environmental science. The Board's 1971 report concludes:

> Governments at the local, State and National level have responded rapidly to the sense of environmental crisis, creating a variety of new institutions. Most of these are oriented to problems arising from pollution, or those associated with resource allocation. They are directed more to the applications of science than to its development, and more to the solution of well-defined individual problems than to broad-scale advances in the basic scientific capability for solving such problems. These immediate efforts are important and necessary developments if man is to improve relations with his environment, but they are not sufficient to insure long-term or permanent gains.
>
> A Federal mechanism is also urgently needed specifically to provide for the promotion and support of environmental science as a whole. Such a mechanism should be responsible for insuring that the knowledge, understanding, and predictive power concerning environmental systems be developed in accordance with perceived needs to solve environmental problems and to improve human welfare. Such an activity would supplement, not duplicate, those of organizations concerned with managerial aspects of the environment or with the forecasting of environmental events. By being responsive to their priorities, however, such a mechanism would speed the development of the scientific tools that these institutions require.

The report highlighted the Federal responsibility for "The establishment of organizational and employment incentives suitable for the types of projects that are characteristic of environmental science through the support of national centers and specialized institutes."

The study conducted by a multi-disciplinary Committee drawn from the staff of the Oak Ridge National Laboratory at the request of Senators Edmund S. Muskie and Howard H. Baker, outlining the purposes, organization and functions of National Environmental Laboratories, provided extensive and detailed analysis of the National Environmental Laboratory concept accompanied by a lengthy discussion of the gaps in the current research structure. The Subcommittee invited reactions to this proposal and received comments from 65 sources, which have been published as a document of the Committee on Public Works. Many suggestions and criticisms on the specific proposal were received, and the major points of concern are discussed below. The overall sentiment of the respondents was a very strong—in some cases, urgent—plea for the establishment of Federal institutions to accomplish the functions proposed for the National Environmental Center under the bill S. 1113.

Hearings

In the 92nd Congress, on March 4, 1971, Senator Baker, for himself and Senator Muskie along with 27 other Senators reintroduced a bill,

S. 1113, to establish a National Environmental Laboratory. Subsequently, 16 other Senators have asked to join as cosponsors of the bill. Following introduction of the bill, the Subcommittee on Air and Water Pollution held six days of hearings on April 28 and 29, May 3, 4, 5, and 6, 1971. Witnesses included Senator Henry M. Jackson, Senator Edward J. Gurney and Senator Lawton Chiles. Congressmen Joe L. Evins and Mike McCormack also testified. Governor Francis W. Sargent of Massachusetts testified. Representatives of the Federal government who testified included Dr. Stanley M. Greenfield, Assistant Administrator, Research and Monitoring, EPA; Dr. William D. McElroy, Director, National Science Foundation; and Dr. Gordon J. C. MacDonald, member of the Council on Environmental Quality. Thirty-four witnesses appeared and additional material was filed with the committee from approximately 40 sources. The testimony and additional material has been made a part of the hearing record.

Following hearings on the bill S. 1113, the Subcommittee directed the staff to conduct a survey of the scope and extent of environmental research currently being conducted by Federal agencies and organizations. The intent of the survey, as stated by Chairman of the Subcommittee on Air and Water Pollution, Senator Edmund S. Muskie, in his letter of inquiry to agencies, was to evaluate "details of existing active research programs in environmental science and technology that might be considered to be in conflict with or a complement to the mandate of the NEL's." The agency replies, which are printed as a separate volume of National Environmental Laboratory testimony by the Committee on Public Works, were summarized and analyzed by the staff and scientific advisers of the Subcommittee on Air and Water Pollution. A summary of the replies is included as an appendix to this report. A staff report filed with the Subcommittee on the analysis of the agency comments concluded:

> The areas where existing environmental research is inadequate include:
>
> (1) baseline data on natural systems, and on the present state of the environment;
>
> (2) the means of identifying and quantifying, or otherwise assessing the social costs of applied technology and resource exploitation;
>
> (3) the global impact of current industrial activity; and
>
> (4) the current global atmospheric and oceanic trends in environmental quality. There was a remarkable agreement among agencies responding on these points * * *. The points highlight the traditional weaknesses of government research: basic research on natural ecosystems (to gather baseline data); social science research; and international or global coordination of data. A new structure may well be needed to address such problems adequately.

Based on these studies, as well as consideration of numerous related documents, hearing testimony, and discussions and correspondence between the members of the Committee, the staff and a wide range of environmental scientists in the country, the Committee concluded that the need for National Environmental Center Laboratories is firmly established.

Major Points of Concern Raised in Testimony

The responses to the report "A Case for National Environmental Laboratories," and testimony of the hearings brought to light several major issues involved in the scope and function of the proposed National Environmental Laboratories.

Concern was expressed on the relationship of the proposed National Environmental Laboratories relationship to other recently created or proposed organizations or programs directed toward certain aspects of environmental quality. These include (a) The Institute of Ecology, initiated by the Ecological Society of America with assistance from the National Science Foundation; (b) the National Science Foundation grant program, Research Applied to National Needs; (c) The President's Council on Environmental Quality; (d) the Environmental Policy Institute proposal by the President and pending legislation; (e) existing laboratories of Federal agencies; (f) the Office of Technology Assessment proposed by the House of Representatives Committee on Science and Astronautics; (g) the State Environmental Center Act of 1971 and (h) the Environmental Data Bank proposed by the Committee on Merchant Marine and Fisheries of the House of Representatives.

The Institute of Ecology

Testimony from Dr. Robert F. Inger, Chairman Pro Tem, Board of Trustees, the Institute of Ecology (formerly, Inter-American Institute of Ecology, and National Institute of Ecology) made clear that the National Environmental Centers the Institute of Ecology, and any future Executive Branch policy board would have distinctly complementary, rather than overlapping, functions. From his and related testimony, it is clear that the National Environmental Centers would be concerned with environmental problems of all kinds, emphasizing the application of comprehensive and integrated research to the full range of environmental problems which result from man's activity. The National Environmental Centers would perform broad analysis which should provide the framework within which to develop and implement the assessment of new technology on the structure and functioning of human society and the environment. In addition the National Environmental Centers would provide the capacity to integrate the monitoring of environmental quality and the detection of regional, national, and global trends in the state of the environment with the corrollary ability to identify the factors which "contribute to the disturbance of the physical, chemical or biological integrity of the biosphere". The Institute of Ecology would bave a narrower mission—namely, to enhance the science of ecology through research on ecosystems leading to the identification of principles and patterns which would assist scientists, agencies, and policymakers, both public and private, in dealing with environmental problems.

The Environmental Policy Institute

A policy board, institute, or other panel if it were to be established in the Executive Branch, as proposed by the President and in pending legislation would not conduct research, but would use the information already available in order to formulate public policy recommendations

to deal with environmental problems. Although such an Institute has not yet been created, the outline of the Policy Institute would be a private organization, of a think tank nature, with a very small staff and no original research component. The Policy Institute would be a group of men surveying existing knowledge and making assessments and recommendations thereon. There does not appear to be any conflict between the bill S. 1113 and the Policy Institute proposals.

The Council on Environmental Quality

The Council on Environmental Quality does not conduct research, but rather coordinates Federal environmental activities, including processing and reviewing of Environmental Impact Statements, as required by the National Environmental Policy Act of 1970.

The National Science Foundation

The Research Applied to National Needs program of National Science Foundation provides funds for research primarily for investigators at academic institutions. It is not designed to support an integrated program with the capability to address the massive, long-term, national and global environmental problems through the kind and size of institution envisioned by the NEL's; nor would the RANN program serve as a permanent organ for the monitoring of trends in environmental quality. The RANN program does offer a means to fund a diversity of programs on environmental issues and to continue to generate graduate training and to motivate the application of creative thinking among scholars and students.

Office of Technology Assessment

An Office of Technology Assessment is proposed in legislation pending in the House of Representatives where it has been reported from the Committee on Science and Astronautics and is now pending in the House Rules Committee. A companion bill, S. 2302, introduced by Senator Jordan is pending in the Senate Rules Committee. S. 2302 would establish an Office of Technology Assessment for the Congress, including service in the identification and consideration of existing and probably impacts of technological application. The Office would be a small organization structurally created as an adjunct of the Congress, as distinct from the Executive branch. It would provide assistance to the Congress in determining the impacts of matters relating to technology which are routinely brought before it. There is no conflict whatsoever between the Office of Technology Assessment and the National Environmental Laboratories. In fact, they are inherently complimentary and it is hoped that at some time the two proposals could be integrated.

State Environmental Centers

A bill, S. 681, introduced by Senator Bellmon would establish Environmental Research Centers in each State basically after the model of the agricultural extension service. The function of these Centers would be to provide each State with research and development and

continuing education capability to respond to the environmental problems in such States. It would also provide a mechanism for providing assistance to institutions in each State for the conduct of environmental research. Certain aspects of this proposal are complementary to the purpose of the National Environmental Center and other provisions do not conflict.

National Environmental Data Bank

A bill, H.R. 56 which passed the House of Representatives on May 17, 1971, and is now pending before the Senate Interior Committee, would amend the National Environmental Policy Act to authorize the establishment in the Council on Environmental Quality of a National Environmental Data Bank. This narrow function would conflict with an important component of the NEL's. However, it is the judgment of the Committee that the piecemeal approach represented in this bill, separating research from data acquisition, is not sound. Also, the "Data Bank" will have greater value if it coincides with an active national environmental research programs such as the National Environmental Center would conduct.

Federal Agencies

The extent of environmental research going on in existing Federal agencies was extensively reviewed by the Committee. The comments solicited from the Agencies indicate that the existing environmental research program is deficient precisely in the areas the National Environmental Centers would be expected to address.

The testimony indicated that the National Environmental Centers would play a distinct and essential role in the mattrix of institutions being created to deal with environmental problems.

The underlying premise of the National Environmental Center is that an independent, broad-based and securely funded organization is necessary and essential if this Nation is to develop a scale and scope of research which will generate the knowledge which is in such demand in our expanding technological society. Only with independence from mission or regulatory functions can the research program be drawn with a high level of integration and coherence. The Environmental Protection Agency, working under statutory mandates, accompanied by deadlines, simply cannot and should not, detach its research effort from supporting its regulatory programs. While this EPA R. & D. is necessary, it does prevent research programs of a truly multidisciplinary, large scope, character from being implemented. The research of the EPA is often directed toward the adversary nature of rule-making processes and procedures. It is simply not adequate to address the broader issue to which the National Environmental Centers are directed but should serve to make input into National Environmental Centers.

The research activities of the Federal agencies are described generally by Congress to support one or another function or mission which such agencies are directed to perform. This research is absolutely essential to carrying out the mandate of these agencies. This is especially true of the Environmental Protection Agency, where strong research and development components are mandated under the Clean Air Act, the Resources Recovery Act, and the Federal Water Pollution Control Act. These activities, however, do not, and should not, provide

the fully integrated and comprehensive research intended to be performed by National Environmental Laboratories. The research at Federal agencies such as the Environmental Protection Agency however should provide important components in the fabric of the National Environmental Laboratory research program.

At the present time no Federal agency is charged with the responsibility for and provided with the resources to draw upon the broad range of existing public and private research and development activities and, through supplementing such activities with its own unique competence, to forge a broad, systematic, and long-term view of man's impact on the global environment. Through its close relationship with existing public and private efforts, and through the selective commitment of its financial resources by grant, contract, and interagency transfer, the National Environmental Center apparatus will inevitably influence, to some degree, the direction of the work being done by existing organizations.

Extracts from a colloquy between the chairman of the subcommittee, Senator Muskie, and Senator Baker with Dr. Gordon MacDonald, member of the Council on Environmental Quality, are helpful in considering the relationship of the proposed bill to the existing Federal structure.

> Senator MUSKIE. I don't think we object to the idea of trying to fit existing laboratories in the concept of our bill. What we are really pressing for is an integrated, mission-oriented approach. I am still uncertain as to what your objective is. You use the language, you talk about integration, you talk about using laboratories, but I am not sure that the end result is going to be the kind of integrated, mission-oriented approach to research that we think we need.
>
> My doubts are intensified by your analysis of the steps that have been taken thus far—they have all been useful steps—to bring our environmental agencies together.
>
> * * * * *
>
> Now, those are not integrated. They each, as I understand them, have some of the responsibilities we are talking about in the pending legislation, but they are scattered; they are not integrated. I am sure there is coordination; I am sure there is liaison, but I doubt that you could describe that as integration.
>
> Dr. MACDONALD. Yes; I think we could describe it as integration in the very best sense of the word.
>
> * * * * *
>
> Senator MUSKIE. Where would the integrated direction come from?
>
> Dr. MACDONALD. The integrated direction we feel is the responsibility of the Council on Environmental Quality.
>
> Senator MUSKIE. That is my understanding; it is a coordinating agency and not an operational agency with the authority for direction. Coordination, yes, but to what extent does it have authority for direction?
>
> Dr. MACDONALD. I would hope that in the coordination we could also exert some leadership, exercise some direction

of the research activity, both within the laboratories and within the new institute. Specifically, in terms of the institute, for example, our proposal would be that the work program of the institute would be discussed on a yearly basis by the Council with the management of the institute but there would be a very heavy input from the Council.

Senator MUSKIE. It is not the kind of integration that exists, say, at NASA or the AEC? It depends as much, if not more, on coordination as it does on direction?

Dr. MACDONALD. Yes.

* * * * *

Senator BAKER. Mr. Chairman, thank you very much.

I must say that while there are several problems I am confronted with from time to time, few are more serious than what I am confronted with in your testimony here. There is something intriguing in this era of adversary politics in Government to find that one agrees in principle but disagrees in the matter of implementation.

Would you agree that is essentially what we are talking about?

Dr. MACDONALD. Certainly.

As I emphasized in my testimony, we agree with the basic purpose and thrust of what your bill is trying to accomplish.

What we disagree with is establishing at this time a totally new institution or organization. What we want to do is look at what we have, analyze its capabilities and its potential capabilities and then move forward to try to do the things you want us to do.

Senator BAKER. * * *

It is clear to me from reading that summary, after looking at your report and, of course, from hearing your statement today, that you do feel there is a need for an overall, coherent effort in this field and do feel the need to eliminate fragmentation and diversity of effort in our environmental efforts.

In that report at that time, filed in January of 1970 you indicated:

"There is no laboratory in the Federal Government that now carries out systematic research on the environment as a whole. Present efforts are specialized and atomistic, and the overall ecological systems approach has not been adopted by any single Federal agency.

"We recommend the establishment of a National Laboratory for the Environmental Sciences, which might well be contractor-operated as other national laboratories are, and funded by the several federal agencies with environmental responsibilities. Its research goal should be the development of knowledge and techniques that will lead to effective management of the environment. Its prime missions would be to carry out research in the environmental sciences and to develop a quick-reaction field function that would call attention to potential threats to the environment. It would

perform research in monitoring but should not have operational responsibility for a monitoring program. It would conduct analysis of its research results but not be as policy-oriented as the Institute of Environmental Studies.

"A National Laboratory is one of the essential components of the institutional framework we believe necessary to meet the Nation's needs for environmental research."

I confess a greater attraction to that statement in 1970 than I do to your statement today.

However, once again I am pleased that we find a disagreement on the method of implementation only.

* * * * *

But, may I ask you now, Doctor, whether the concerns that you have expressed about the wisdom of creating another layer of institutional effort the NEL's, might disappear or at least be diluted if the bill were amended to put these NEL's under EPA?

Dr. MACDONALD. First, I would certainly say what they should not be; if they were created they should not be put under CEQ. CEQ, as the chairman has mentioned, is not an operational agency in the usual sense. It is a policy advisory organization.

I think we would still have problems in creating a new organization within EPA prior to really understanding what the capabilities are within the existing laboratories and both within EPA and out of EPA.

* * * * *

If the NEL's were in the business of research for an enforcement agency, might there not be at least a slight suspicion that their mission was oriented toward the justification of a policy determination of the parent agency? Would that concern you?

Dr. MACDONALD. * * *

I think it is a very legitimate criticism of having the standard-setting function and the research function together when the research function is broader than the research required to set standards.

Senator BAKER. Do I understand that to mean that you would not want the NEL's if they were created or the research effort mandated by S. 1113 to be a part of the EPA function because of that?

Dr. MACDONALD. If they were to be created, and I am, of course, opposing their creation, but if they were to be created, I agree with you that there is value both in having them independent of EPA and also the point that I made in my earlier response to you that environment is much more than pollution control.

There are many aspects of R. & D. that have a great environmental importance that are not involved in the functions or not part of the responsibilities of EPA.

Senator MUSKIE. Would the Senator yield?

Senator BAKER. Yes, sir.

Senator MUSKIE. It seems to me that the net effect of your testimony, Dr. MacDonald, is a strong case for independent NEL's.

Dr. MACDONALD. I would hope that this is not so.

Senator BAKER. Well, the points I am trying to reach, in order to abbreviate this colloquy, are that I appreciate and agree with your view that there ought to be integration of research efforts, efforts that are now fragmented throughout the Government.

I disagree they can or ought to be done within existing agencies, particularly EPA, for many reasons. One, because I think that without a centralized mission-oriented institution as such you will not preserve the continuity of effort that independent NEL's would; that any research efforts by NEL's, if they were part of EPA, or corresponding functions of any group of agencies as a part of EPA, would be suspect as long as EPA is a standard-setting and enforcement agency; that there is a likelihood they will be more severely limited to immediate problems than long-term problems on the research effort; that there is a good likelihood that we will avoid the possibility that these agencies can assume the stature of the Bureau of Standards in this field, that is, a final arbiter of scientific knowledge; and, finally, that we cannot ignore the most severe problem in this whole field, and the one we pay least attention to in the final analysis, the international aspects.

An independent NEL is far more likely to serve as a forum for international discussion and investigation than is a line agency such as EPA. That obviously is a speech and not a question.

MANPOWER

Concern was expressed that the limited existing pool of scientific manpower trained to address environmental problems in a broad, interdisciplinary way is not adequate to support the National Environmental Center without severely draining the staffs of existing institutions.

The National Environmental Center will not rise full-blown within the first year of operation. The National Environmental Laboratories would be expected to draw upon the pool of ecologists, engineers, social scientists and others in academic institutions, industry, and government, and in addition to tap appropriate sources of manpower currently available in aerospace, and nuclear sciences, engineering, physics, chemistry and some branches of biology. It is especially important that professionals trained in the disciplines of biological ecology, meteorology, economics, sociology, resource management, and systems analysis be included along with the other professionals in the conduct of research in the National Environmental Center. While such sources of manpower are believed to be adequate for the initial stages of operation of the National Environmental Center, the Committee feels it will be important to include, from the early stages of National Environmental Center operation, mechanisms for the employment and training of graduate students on problems of concern to

the National Environmental Center through cooperative programs with universities and the student's thesis committee. In this way, not only will strong channels of information flow and feedback be established between the National Environmental Center and universities, but a nurturing ground for the generating of scientists with an interest and training in environmental problems will be assured.

Independence

Concern was expressed regarding the ability of the National Environmental Center to perform research on environmental problems while maintaining the independence necessary to explore long-range and basic research problems, examining the full range of alternative solutions to environmental problems, free of pressure from any source. It is the intent of the Committee that independence is essential and should be provided. In order to assure this freedom from pressure while at the same time assuring relevance the bill would provide an organization with legal and structural independence, placing full responsibility in a Board of Trustees appointed by the President with the advise and consent of the Senate.

The committee has provided the Board a broad range of managerial and organizational options for carrying out its responsibilities. It is the intent of the committee that the Board use its authority imaginatively and creatively to draw upon private and public research capabilities.

The Board has authority to establish or designate six environmental laboratories. Additional authority is provided by which the Board can conduct research for, and can obtain needed research from, public and private research organizations. It is expected that the Board will use the flexibility provided by its contract and grant authority to establish relationships with existing public and private research organizations, and that it will utilize the interagency transfer authority to draw upon existing Federal research capabilities where appropriate.

Imaginative use of the contract authority provided in section 5 will permit the Board not only to utilize the research capability of others, but to make the capability of the NEL structure available to do work for eligible public and private entities and individuals.

Research Areas

The mandate of the National Environmental Center generally described in the bill is intended to include the following features:

(1) Analysis of the problems caused by the alteration of natural eosystems by man, both in the urban and the rural environment, directed toward an understanding of, and devising means (technological and social) of alleviating or resolving problems relating to the environment.

(2) Monitoring trends in environmental quality, regionally, nationally, and internationally. This monitoring function should be accomplished through the use of existing data and monitoring capabilities, as well as through any new facilities, operations or assignments needed to supplement existing work. An important function in this task will be to identify any national or global shifts in environmental

quality which may require correction through public policy. Environmental quality is intended to refer not only to media—air, land and water—but also to the state of health of the organisms which depend on those media for life support.

(3) The study of ecosystems in a natural state, relatively unaltered by man, in order to increase our knowledge of baseline environmental quality and to increase our understanding of the structure, and function of natural systems. Capability should be developed both to detect shifts in quality from the natural, and to predict the character of shifts in the state of nature resulting from natural and man-induced causes. Studies of man-altered ecosystems would also be undertaken for comparative purposes.

(4) The development of alternative social technology, and management policies for environmental quality maintenance. Destruction of environmental quality may be slowed not only by the development and demonstration of technological devices, chemicals or biological control methods, but by the devising of alternative methods of resource use; management; extraction; conservation, land use practices; water use, air quality; waste disposal and recycling practices, and numerous other policies relating more broadly to the restoration and maintenance of the physical, chemical and biological integrity of the biosphere.

(5) Assessment of the impact of new technology, environmental management practices, and other projects or developments on the health and welfare of human society and the environment. The impact of inventions, (from automobiles to supersonic transports), of projects, (from dams and vast new electric power developments to pipelines and transportation systems); of management practices (from clearcutting and spray programs for pests to urban planning schemes)—all of these developments could have profited from a predictive analysis of the direct and indirect and reciprocal effects of implementation of such schemes on the natural environment, on social and economic sectors of human society, on population growth and distribution, on energy consumption patterns, on the aesthetic and material quality of life.

The tasks of assessment and prediction are not easy, but with the use of scenarios and discussions, of computer models and systems analysis, of numerous theoretical tools being developed in the social and natural sciences, and with participation by sociologists, economists, ecologists, lawyers, political scientists, psychologists, historians, and anthropologists, among others, the best knowledge of our present society can be employed to assess and predict future impacts. Hopefully such an endeavor will serve to produce suggested guidelines in order to guide the development of society along beneficial lines.

International Aspects

Most of the nations of the world are aware of and concerned with polluted water supplies, degradation of agricultural lands, depletion of wildlife and fisheries, and the deterioration of cities. Some of these problems will be addressed at the U.N. Conference on the Human Environment to be held in Stockholm in June 1972. The Conference will provide governments with the first opportunity to consider, on a global basis, the important implication of environmental problems

for their own people, the extent to which they bear on their own interest and aspirations, as well as on the welfare of the entire human community.

The United States now is preparing its position for the important conference. The National Environmental Center should be given a large role in following up on the recommendations that will emerge from the Conference. Additionally, the Board should be assigned the responsibility for acting as the focal point of the U.S. effort in international environmental affairs, especially in environmental monitoring.

ESTIMATED COST OF THE LEGISLATION

In accordance with section 252(a) of the Legislative Reorganization Act of 1970 (Public Law 91–510), the committee estimates that the cost of S. 1113 will be as follows:

(1) The 4-year Federal cost for the National Environmental Center Special Trust Fund will be $200,000,000; $50,000,000 for each fiscal year beginning with fiscal year 1973 and extending to fiscal year 1976.

(2) The Federal cost to carry out, for 2 fiscal years, the operation of the National Environmental Center and constituent laboratories will be $120,000,000; $40,000,000 in fiscal year 1973 and $80,000,000 for fiscal year 1974.

The committee is not aware of any estimate of costs made by any Federal agency which are different from those made by the committee.

CHANGES IN EXISTING LAW

There are no changes in existing law resulting from this legislation.

ROLLCALL VOTES

No rollcall votes were taken in committee during the consideration of this legislation.

DEPARTMENTAL REPORTS

The following are reports from the various departments and agencies on the bill S. 1113 on which the Committee held hearings:

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF MANAGEMENT AND BUDGET,
Washington, D.C., May 12, 1971.

Hon. JENNINGS RANDOLPH,
Chairman, Committee on Public Works, U.S. Senate, New Senate Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your letter of March 10, 1971, requesting our views on S. 1113, a bill "To establish a structure that will provide integrated knowledge and understanding of the ecological, social, and technological problems associated with air pollution, water pollution, solid waste disposal, general pollution, and degradation of the environment, and other related problems."

The Environmental Protection Agency, in its report to you on this legislation, recommends against enactment of S. 1113. We concur fully in the views expressed by EPA. In addition, the Treasury Department has commented on those aspects of the bill dealing with a trust fund and the Office of Management and Budget concurs in those views.

We support the general objectives of the bill: i.e., to assure that the Federal Government fosters or supports the broad range of research that is required to contribute solutions to the vexing environmental problems which confront us. We would point out, however, that the Federal Government, since the concept of a national environmental laboratory was initially proposed, has taken a number of steps to achieve the objectives of that proposal. Most notable among these steps were the establishment of the Council on Environmental Quality by Public Law 91-190, and the creation of the Environmental Protection Agency by Reorganization Plan 3 of 1970. The creation of EPA has provided the organizational arrangements and the authorities that are needed to assure a comprehensive approach to the research and development required to address environmental protection problems. Among its responsibilities, the Council on Environmental Quality is charged with promoting the coordination of all environmental quality programs and with making a thorough review of all other Federal programs which effect the environment.

In our view, an additional environmental organization, such as is proposed under S. 1113, would unnecessarily diffuse responsibility for research and development relating to environmental protection and contribute to the chances of unnecessary duplication and overlap in research and development efforts. We believe that clear and ample authority is available to conduct or support the research that is required.

For the reasons listed above, we recommend against the enactment of S. 1113 and urge that the Congress not impose new organizational arrangements for which there is no clearly demonstrated requirement.

Sincerely,

GEORGE P. SHULTZ,
Director.

GENERAL COUNSEL OF THE TREASURY,
Washington, D.C., May 7, 1971.

Hon. JENNINGS RANDOLPH,
Chairman, Committee on Public Works,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Reference is made to your request for the views of this Department on S. 1113, "To establish a structure that will provide integrated knowledge and understanding of the ecological, social, and technological problems associated with air pollution, water pollution, solid waste disposal, general pollution, and degradation of the environment, and other related problems."

The bill would establish a National Environmental Laboratory to conduct research, development, and analysis of environmental problems. The Laboratory would be directed by a nine member Board of Trustees. The Board would be authorized to establish up to four regional laboratories. A special trust fund would be authorized for the perpetual maintenance and support of the long-term research activities of the Laboratory. There would be authorized to be appropriated to the Board to be deposited in the trust fund $50 million per year for five years beginning with fiscal year 1971. In addition, there would be authorized to be appropriated such sums as may be necessary to carry out the purposes of the Act, but not more than $200 million could be appropriated for the use of any one regional laboratory.

Amounts in the trust fund would be invested in interest-bearing obligations of the United States or in obligations guaranteed as to both principal and interest by the United States. Yet there would be no provision for the payment of interest on appropriations to the funds.

The Laboratory was referred to by the author of the predecessor bill S. 3410, 91st Congress, as a "new agency of the Federal Government," and like other Federal agencies, the Board would receive annual appropriations and be subject to the normal budgetary review process. However, the majority of the Board, although appointed by the President, would be private citizens; the General Manager and officers of the Laboratory, and the Director and officers of regional laboratories would be appointed by the Board without regard to the provisions of title 5 of the United States Code governing appointments in the competitive service; and there is no provision giving other employees of the Laboratory civil service status.

The "Special Trust Fund" established by S. 1113 would be an inappropriate means of financing a Federal agency. Trust funds are defined under the present unified budget as funds held in a fiduciary capacity by the Federal Government for use in carrying out specific purposes and programs in accordance with the terms of a trust agreement or statute. There is no apparent fiduciary relationship between the Federal Government and the Board or the Laboratory. The

investment of appropriations made to the fund would also be inappropriate. Such investment would result in financing the Laboratory program from the appropriation for "interest on the public debt" to the extent of the payment of interest for credit to the fund. Thus the payment of interest to the trust fund would provide a measure of backdoor financing for the program.

In view of the foregoing, the Department would be opposed to the enactment of the bill.

We would also note that several major steps have been taken by the Federal Government to achieve the basic objective of S. 1113 since the concept of a National Environmental Laboratory was originally proposed. These steps include the creation of the Environmental Protection Agency, the creation in the Department of Commerce of the National Oceanic and Atmospheric Administration, the establishment of the Council on Environmental Quality, and the recent proposal by the President that the Federal Government support the establishment of a non-profit Environmental Institute which would conduct policy studies and analyses. In view of these steps, we question whether there is a need for the actions contemplated by S. 1113.

The Department has been advised by the Office of Management and Budget that there is no objection from the standpoint of the Administration's program to the submission of this report to your committee.

Sincerely yours,

SAMUEL R. PIERCE,
Jr., *General Counsel.*

ENVIRONMENTAL PROTECTION AGENCY,
Washington, D.C., May 5, 1971.

Hon. JENNINGS RANDOLPH,
Chairman, Committee on Public Works,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Your Committee has requested the views of the Environmental Protection Agency on S. 1113, a bill "To establish a structure that will provide integrated knowledge and understanding of the ecological, social, and technological problems associated with air pollution, water pollution, solid waste disposal, general pollution, and degradation of the environment, and other related problems."

S. 1113, the "National Environmental Laboratory Act of 1971," would establish a national environmental laboratory for the purpose of providing a unified and systematic approach to the problems of technology assessment and environmental quality. There will be conducted at the Laboratory basic research, development, analyses of human and natural activities affecting the environment, including but not limited to: data collection, storage, and dissemination, data analysis and synthesis, the development of methods and devices, training and education, and objective analysis of various environmental policy alternatives; the formulation of, and where appropriate, the development, testing, and demonstration of, alternative solutions to existing and probable environmental problems, and the performance of other functions to assist public, private agencies, and persons in the restoration, enhancement, and protection of the environment. The bill specifically provides that the making of specific policy recommendations and choices as to alternative courses of action shall not be an

appropriate function for the Laboratory or any of its constituent parts; however, it may present to policymakers various alternative courses of action and describe the probable results of each course of action.

S. 1113 would also create a Board of Trustees of the Laboratory, which would be responsible for maintaining and administering the Laboratory and its sites. Membership on the Board would consist of nine members as follows: Administrator, EPA, Chairman of the Council on Environmental Quality, Director, Office of Science and Technology, Director, National Science Foundation, and five members appointed by the President from the general public. S. 1113 stipulates that no more than three of the public members of the Board may be members of the same political party. Board members would serve for a term of six years.

The Board would be empowered to establish regional national environmental laboratories, not to exceed four in number, with the geographical distribution of any such regional laboratory determined by environmental criteria; to establish broad policy directions for the Laboratory as determined from an analysis of social and environmental priorities established by the Congress, the Executive branch, and the private sector; to obtain grants from and make contracts with State, local, and private agencies, organizations, institutions, and individuals; and, to coordinate with all public and private agencies so as to avoid unnecessary duplication of environmental research and development activities.

The sum of $50 million for each of four consecutive fiscal years, beginning with the fiscal year ending June 30, 1972, would be authorized to be appropriated to the Board to carry out its functions. This sum would be deposited in a fund to be called the "Special Trust Fund" for the perpetual maintenance and support of the long-term research activities of the Laboratory. In addition, S. 1113 would authorize such sums to be appropriated as may be necessary to carry out the purposes of the Act, provided that no more than $200 million would be appropriated for use of any one regional laboratory.

The General Manager of the Laboratory would be required to transmit to the President and to the Congress an annual report setting forth audit reports, bibliographies with annotations, research performed, and a description of ongoing research programs.

The Environmental Protection Agency supports the objectives of the bill; however, we believe enactment of S. 1113 is unnecessary to achieve these objectives. Accordingly, we recommend that the bill not be enacted. The reasons for this recommendation are discussed in detail below.

S. 1113 is substantially the same as S. 3410, which was introduced in the 91st Congress. Since the concept of a "National Environmental Laboratory" was originally proposed, a number of steps have been taken to strengthen Federal organization and programs for the conduct and support of research in the areas that are covered by the bill.

EPA was created on December 2, 1970, by Reorganization Plan No. 3 of 1970. By virtue of this action, authority, responsibility and resources were combined in EPA to carry out a comprehensive program of research relating to pollution, degradation of the environment, and related programs.

The validity of the objectives of S. 1113 was recognized when EPA was created. As indicated in the President's message transmitting Reorganization Plans Nos. 3 and 4, "This reorganization would permit

response to environmental problems in a manner beyond the previous capability of our pollution control programs. The EPA would have the capacity to do research on important pollutants irrespective of the media in which they appear and on the impact of these pollutants on the total environment. Both by itself and together with other agencies, the EPA would monitor the condition of the environment—biological as well as physical. With these data, the EPA would be able to establish quantitative "environmental baselines"—critical if we are to measure adequately the success or failure of our pollution abatement efforts."

Many of the authorities and responsibilities of the proposed National Environmental Laboratory would totally overlap authorities and responsibilities of EPA with respect to research, demonstration, studies, monitoring, surveillance, training, and other areas.

Among the R. & D. authorities combined in EPA are the following:

(1) Sections 5 and 6 of the Federal Water Pollution Control Act, as amended, authorize EPA's basic research, development, and demonstration program for supporting its water quality enhancement activities. The programs transferred to EPA from the Department of the Interior included: in-house research and development at eight water quality laboratory locations and at a number of associated sites; contract projects, primarily with industry for laboratory investigations and pilot-scale research projects aimed at determining the feasibility and development of design requirements; and grant projects with universities, States, and municipalities. EPA's research, development, and demonstration effort in water pollution control is directed toward pollution problems from municipal, industrial, agricultural, mining, and other sources, supplemented by special authorities to support both pilot-scale and full-scale demonstration programs on storm and combined sewer dischargers, advanced waste treatment and wastewater renovation, and industrial waste treatment and control.

(2) Section 103 of the Clean Air Act, as amended, authorizes the EPA Administrator to establish a national research and development program for the prevention and control of air pollution and to construct such facilities and staff, equipped as necessary, to carry out his responsibilities in this area. Subsection (f) of this section directs him to give special emphasis to research on the short- and long-term effects of air pollutants on public health and welfare and to conduct an accelerated research program to that end. Section 104 of the Act directs the Administrator to conduct and accelerate research and development programs into new and improved methods, having industrywide application, for the prevention and control of air pollution resulting from the combustion of fuels, and the development of low-cost instrumentation techniques to facilitate determination of quantity and quality of air pollutant emissions, including the establishment and operation of necessary facilities and test sites at which to carry out such research, testing, and development. Air pollution control research activities are primarily conducted at the Durham, North Carolina, research center and at facilities in Cincinnati, Ohio, where efforts are being directed primarily toward the testing of monitoring devices and assessing the effects of airborne pollutants on commercial and ornamental vegetation.

(3) Section 204 of the Solid Waste Disposal Act, as amended, authorizes the EPA Administrator to conduct research, investigations, experiments, demonstrations, and studies relating to adverse health

and welfare effects of solid waste on the environment and the reduction of the amount of such wastes released; and the development and application of new and improved methods of solid waste collection disposal, and recovery. Solid waste disposal and resource recovery research activities are conducted at EPA's Research Services Laboratory in Cincinnati, Ohio.

(4) Section 301 of Title III of the Public Health Service Act, as amended, is the statutory authority for the Administrator to conduct a broad program of research, investigation, and experimentation on the environmental effects of radiation. Radiation R. & D. activities such as field studies at operating nuclear reactors investigating mechanisms for the production, release, and disposal of radionuclides in the environment, the testing and development of radiation detection equipment to identify and qualify radionuclides discharged from nuclear reactors, and studies on the effects of dispersal patterns and transmission media on radionuclide contamination of the environment are carried out at facilities in Las Vegas, Nevada, Montgomery, Alabama, and Winchester, Massachusetts.

(5) Authority for the conduct of research relating to EPA's activities in pesticides was transferred from: the Secretary of Health, Education, and Welfare (Food and Drug Administration) pursuant to the Federal Food, Drug, and Cosmetic Act and the Public Health Service Act, as amended; the Secretary of Agriculture, pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, and Section 408(l) of the Federal Food, Drug, and Cosmetic Act, as amended; and the Secretary of the Interior pursuant to the Act of August 1, 1958 (16 U.S.C. 742d–1), relating to studies on the effects of insecticides, herbicides, fungicides, and pesticides upon the fish and wildlife resources of the United States, and those functions of the Secretary administered by the Gulf Breeze Biological Laboratory of the Bureau of Commercial Fisheries. In addition to its Gulf Breeze, Florida facilities, EPA's pesticide research is also being conducted at Perrine, Florida, and Atlanta, Georgia.

(6) Authority to conduct investigations, studies, surveys, research, and analyses relating to ecological systems was transferred to EPA from the Council on Environmental Quality.

(7) The Clean Air Act Amendments of 1970 (Section 401) authorize the conduct of research, experiments, and demonstrations relating to noise and its effects.

Pursuant to these and other authorities, EPA and its predecessor agencies have been conducting a broad-scale research, development, and demonstration program on a wide variety of pollution problems. In addition to the authority already available to EPA, new legislation has been proposed as a part of the President's environmental program, as described in his February 8, 1971, message to the Congress, which will broaden the authority for EPA R and D activities in noise abatement and pesticides, and give new authority to EPA relating to toxic substances and ocean dumping.

EPA now has underway a major effort to integrate its R. & D. activities and resources into a well-defined and comprehensive program, contemplated by Reorganization Plan No. 3, to meet the objectives of S. 1113. At the present time, EPA is making a thorough review

of the requirements for research and monitoring to support its broad mission and responsibilities, and is also conducting a thorough review of existing research and monitoring activities, facilities, and manpower resources. These reviews will provide the basis for determining what actions, if any, are necessary to assure that EPA has the capabilities that it requires.

In our view, the establishment of the National Environmental Laboratory envisioned by S. 1113 would be highly duplicative of those activities now being conducted within EPA. We do not view the establishment of the new, independent organization as necessary in the national program to restore and enhance environmental quality. In addition, the establishment of the proposed National Environmental Laboratory would run contrary to the underlying principle of Reorganization Plan No. 3, which created EPA as a means of designating and centralizing the pollution control activities of the Federal government.

In addition to the comprehensive program of environmental protection research carried out by EPA, many other Federal agencies are engaged in environmental R. & D. as necessary to carry out their assigned missions. Other agencies involved in a broad range of environmental R. & D. activities include: the Department of Commerce; the Department of the Interior; the Department of Agriculture; the Department of Defense; the Department of Transportation; the National Science Foundation; the Atomic Energy Commission, the Smithsonian Institution, and the National Aeronautics and Space Administration.

EPA is working closely with other agencies to assure proper coordination of our activities. We are already undertaking cooperative efforts with several agencies. For example, EPA and the Department of Health, Education, and Welfare (Food and Drug Administration) have already entered into an agreement to create a "National Center for Toxicological Research" at Pine Bluff, Arkansas. This facility is expected to do research on the effects of long-term exposure to relatively low levels of pesticides and other substances, and, therefore, will support the activities of both agencies.

In summary, EPA believes that the steps that have been taken to improve the environmental organization and programs of the Executive branch since the concept of a national environmental laboratory was originally proposed have made it possible to achieve the objectives of S. 1113 without the creation of a new organization. As indicated earlier, EPA recommends against enactment of the bill.

The Office of Management and Budget has advised that there would be no objection to the presentation of this report from the standpoint of the Administration's program.

Sincerely yours,

WILLIAM D. RUCKELSHAUS,
Administrator.

SECTION-BY-SECTION ANALYSIS

Section 1. Section 1 would establish the short title of the Act as the "National Environmental Center Act of 1971.

Section 2. Section two provides a detailed statement of congressional findings and declaration setting forth the elements of the environmental problem which the Congress finds support the establishment of an organization with independence and sufficient professional breadth and scope to provide a unified and systematic approach to the problems of environmental quality.

Section 3. Section 3 would establish the National Environmental Center at the seat of government.

Section 4. Subsection 3(a) would establish the Center to be managed and controlled by a Board of seven Trustees appointed by the President with the advice and consent of the Senate to serve terms as designated.

Subsection 4(b) would establish a General Public Advisory Committee to advise the Board of Trustees on scientific and technical matters relating to the environmental research and development program of the National Environmental Center.

Subsection 4(c) would establish a Federal Agency Liaison Committee comprised of representatives of Federal agencies for the purpose of keeping the Board of Trustees fully and currently informed of all relevant activities of Federal agencies and keeping all agencies of the Federal Government fully and currently informed of all activities of the National Environmental Center.

Section 5. Subsection 5(a) would establish the powers and duties of the Board of Trustees to include the designation or establishment of six National Environmental Laboratories in locations subject to the approval, by resolution, of the Committee on Science and Astronautics of the House of Representatives and the Committee on Public Works of the United States Senate; to enter into contractual agreements; to establish affiliation with any existing agency or organization; to establish broad policy and directions for the Center and its Laboratories; to accept gifts for deposit in a fund with public disclosure of gifts over five thousand dollars; to obtain grants and to make grants and contracts with other organizations; to make contracts with, and obtain grants from any Federal agency; to act to avoid duplication of environmental research and development activities; to acquire sites for the location of National Environmental Laboratories; to acquire and hold title to equipment, including aircraft, vehicles, and vessels; to appoint a General Manager of the Center for administrative purposes; and to appoint and fix compensation for Directors of each national laboratory and such other officers as may be necessary.

Subsection (b) describes general areas of environmental concern which the Board shall consider at the time of designating the primary research program for any laboratory established.

Section 6 sets forth the requirements and duties of the Directors of each National Laboratory established by the Board of Trustees.

Section 7 provides authority for relocation assistance in the event of land acquisition for the National Environmental Laboratory.

Section 8 provides general authority for the establishment of by-laws, rules and regulations for the administration of the Center and the Laboratories.

Section 9. Subsection (a) establishes authority to create a special trust fund for the long-term endowment of the Center. There is authorized to be appropriated $50 million for each of four consecutive fiscal years with such appropriations available only to invest in interest bearing obligations of the United States.

Subsection (b) requires the Board to transmit to the Committees on Appropriations of the House of Representatives and the Senate, a statement of the expenditures of any funds derived from the special trust fund.

Subsection (c) authorizes the appropriation of $40 million in fiscal year 1973 and $80 million in fiscal year 1974 for the operation of the Center and the National Environmental Laboratories.

Section 10. Section 10 requires the General Manager of the Center to transmit annually to the President and to the Congress a report setting forth the expenditures of the Center and a description of the research programs undertaken by the Center.

Section 11. Section 11 would mandate the Comptroller General to conduct a study of the environmental research activities of all agencies of the Federal Government and furnish Congress with an assessment of conflict, overlap, and coordination.

APPENDIX

The committee is concerned with the potential duplication of environmental research and demonstration programs of Federal agencies. In order to evaluate the scope of such programs and the potential for duplication, Senator Edmund S. Muskie as chairman of the Subcommittee on Air and Water Pollution wrote the following letter to 18 Federal agencies:

MAY 14, 1971.

The Senate Subcommittee on Air and Water Pollution has recently concluded a set of hearings on S. 1133, a bill to establish a series of National Environmental Laboratories. In the course of evaluating this testimony, and the bill itself, it would be helpful to have on record details of existing active research programs in environmental science and technology that might be considered to be in conflict with or a complement to the mandate of the National Environmental Laboratories.

Would you please supply the following information for use by the Subcommittee and inclusion in the Hearing Record:

1. What is the organizational structure of your environmental research program? How many separate laboratories or installations in your agency are engaged in this research? What is the size and composition of the staff of each?

2. What are the fields of specialization of the scientific investigators in your laboratories? What advanced degrees do they hold?

3. What is your present level of funding for environmental research? What is your present level of authorization for environmental research? For how many years?

4. What kinds of problems are you addressing under the category "environmental" research? What proportion of this work would you consider "basic" research, defined as research producing fundamental, theoretical knowledge which was not sought for immediate problem-solving purposes? What proportion is devoted to technology development? To technology assessment?

5. List your current research projects on ecosystem structure and function, if any.

6. How much of your environmental research is conducted at your own facilities? How much is done by contract to other institutions? Please indicate the proportion of contract work assigned to each of various types of institutions (aniverity, independent research firm, industry, etc.).

7. What mechanism, if any, do you have for identifying and addressing large-scale environmental questions by interdisciplinary teams? What mechanism do you have for coordinating your activities with the Environmental Protection Agency? Please include copies of any memoranda or letters of agreement which detail your coordination mechanism.

8. What important questions, if any, are you unable to research adequately within your existing research structure? What are the main hindrances to proceeding with such research?

Thank you for your cooperation in replying to these questions. Inasmuch as the Subcommittee has concluded hearings on the bill to establish National Environmental Laboratories and is presently coordinating materials for final printing, I would appreciate your expediting a response to the above inquiry no later than June 15.

Sincerely,

EDMUND S. MUSKIE,
Chairman, Subcommittee on Air and Water Pollution.

This appendix summarizes the responses from the Federal agencies.

In order to assist in reading this appendix, the following abbreviations are used for the organizational names indicated:

ARS—Agriculture Research Service.
AEC—Atomic Energy Commission.
CEQ—Council on Environmental Quality.
CSRS—Cooperative State Research Service.
DI—Department of the Interior.
DOT—Department of Transportation.
EPA—Environmental Protection Agency.
FDA—Food and Drug Administration.
GAO—General Accounting Office.
HEW—Department of Health, Education and Welfare.
HSMHA—Health Services and Mental Health Administration.
HUD—Department of Housing and Urban Development.
NAS-NAE—National Academy of Sciences-National Academy of Engineering.
NBS—National Bureau of Standards.
NCTR—National Center for Toxicological Research.
NEC—National Environmental Center.
NELs—National Environmental Laboratories (earlier name for NEC).
NIEHS—National Institute of Environmental Health Sciences.
NIH—National Institutes of Health.
NIPCC—National Industrial Pollution Control Council.
NOAA—National Oceanic and Atmospheric Administration.
OCR—Office of Coal Research.
OMB—Office of Management and Budget.
OWRR—Office of Water Resources Research.
RANN—Research Applied to National Needs.
SCS—Soil Conservation Service.
TVA—Tennessee Valley Authority.
USDA—U.S. Department of Agriculture.
USFS—U.S. Forest Service.

The responses of GSA, OST and OEP were abbreviated; the National Council on Marine Resources and Engineering Development has completed its work as an advisory council and has been dissolved. The National Science Foundation was not queried for a response since its primary activity is to assist institutions, rather than conduct research in central laboratories. The position of the National Science Foundation to the National Environmental Center proposal is in the hearing record.

In terms of research laboratories oriented to research related to one or another aspect of the environment the following list estimates the relative strength and capability:

Most: EPA, Interior, Agriculture.
Moderate: Defense, Commerce (esp. NOAA), AEC.
Less: Army Corps, TVA, Smithsonian, HEW, DOT.

In terms of scientific staff, EPA, USDA and Interior have the largest qualified staff of professional environmental scientists (over 1000 in each case). The National Bureau of Standards also has a very large staff, but is not currently being utilized intensively for environmental research. The Department of Defense claims 750 environmental scientists in the agency, but these personnel are often used for rather narrow military-oriented purposes. There are less than a dozen ecologists per se in the list of specialists for all agencies combined.

In terms of funding for environmental research, and accepting the Agencys' own judgment on what constitutes environmental research, the funding levels in the agencies are as follows:

Interior ($194 M).
NASA ($175 M).
EPA ($165 M).
USDA ($126 M).
AEC ($74 M).
Defense ($66 M).
Commerce ($63 M).
Army Corps ($23 M).
HEW ($22 M plus unspecified amount for HSMHA).
Transportatiou ($15 M).
Smithsonian ($10 M).
TVA ($4 M).
National Academy ($1.8 M).
CEQ ($0.5 M).

$75 M of Interior's funds is for topographic mapping and water data collection by the USGS, which can only marginally be considered environmental "research". The NASA budget qualifies as environmental only through application of space research to environmental problems, and is somewhat indirect.

The agencies which are currently conducting research which would be most closely associated with research conducted by the NEL's are EPA, Commerce (NOAA), USDA, AEC, TVA, Interior and Smithsonian in roughly decreasing order of relevance to the new set of environmental quality problems which would be addressed by the National Environmental Center. Of these, the Smithsonian, AEC, USDA Forest Service and NOAA have projects on ecosystem structure and function. Interior and EPA projects falling in this category are many fewer than such agencies estimate if we define such projects as those which study organisms at the community level in a natural setting.

Caution must be exercised in interpreting these data as the questions have been interpreted differently. This is especially true of "technology assessment", where for instance DOT thought it meant "assessment of the state-of-the-art of technology" and others thought it meant testing of new devices. Programs which could constitute technology assessment included (*a*) a program in EPA on the effect of new transportation systems and of urban land use on generating air pollution; (*b*) National Academy of Sciences panels reviewing such items as the SST; (*c*) Interior study on the impact of the Alaska pipeline, (*d*) AEC and TVA studies of the environmental effects of power plants. Apart

from these, little, if any research projects look at the broad categories of technology for their longterm social and economic as well as environmental effects.

Estimates of the amount of environmental research done in-house for major agencies are USDA (84%), Interior (high; no quantitative estimate), Defense (50%), and EPA (32%).

EPA has an impressive array of interagency memos of cooperation. They are in the process of developing a data bank for interagency use on research currently under way or completed on the environment. USDA and Interior have special interagency liaison officers on the environment. How effective all these mechanisms are is impossible to judge from the submitted answers. For this reason in section 11 of S. 1113, the Committee instructs the GAO to review the interrelationships between Federal agencies as they affect environmental research.

The agencies which seem best equipped to conduct in-house interdisciplinary research on large-scale environmental problems are AEC and TVA. EPA, USDA, and Interior all have large research programs, but real interdisciplinary cooperation is not essential to their ongoing program.

Summary of Agency Responses to Letter of Inquiry on Federal Research in Environmental Science and Technology

Question: What is the organizational structure of your environmental research program? How many separate laboratories or installations in your agency are engaged in this research? What is the size and composition of the staff of each?

RESPONSES

Army Corps of Engineers: Six laboratories and 1,975 people (including support personnel). Includes Cold Regions Research, water resources laboratories and waterways experiment station. Also available to contract with other government agencies and universities.

General Services Administration: None, except occasional product testing in cooperative programs with other agencies.

National Aeronautics and Space Administration: None, but spin-off from other programs contribute to environmental research.

Council on Environmental Quality: No laboratories; research conducted by staff, or consulting organizations or National Academy of Sciences.

Office of Science and Technology: None.

Atomic Energy Commission: Seven National Laboratories and the Health and Safety Laboratory in New York City. Also contracts with universities and other agencies, industries and non-profit institutions. Approximately 1,050 individual research projects on environment currently, about 400 of these done in National Laboratories.

Defense Department: 36 laboratories, employing 750 scientists and engineers (about 50% of research); remainder done pursuant to contract by universities, independent research firms and industry.

Office of Emergency Preparedness: None.

Tennessee Valley Authority: Six laboratories and field facilities; 195 professional staff and 198 supporting staff.

National Academy of Sciences: No laboratories; but supports 26 boards of consulting scientists on environmental issues.

Department of Health, Education, and Welfare: Federal Food and Drug Administration's National Center for Toxicological Research; National Institutes of Health has one laboratory on environmental health sciences (245 staff; 76 professional); Health Services and Mental Health Administration has three germane programs and one laboratory under construction to study health problems of coal mining.

Department of Agriculture: 156 agricultural research laboratories, 53 experiment stations; 19 forestry research programs, 17 land-grant institutions from 1890 Act; 2,730 scientists-man years in environmental research.

Department of Transportation: Transportation systems center (350 professionals; 575 total) conducts research with some relevance to environmental issues.

Department of Commerce: Maritime Administration—all environmental research is contracted out. National Bureau of Standards—two laboratories devoted partly to environmental research. 1,300 professional staff, 2,800 total. Environmental research about 4% of total. National Oceanic and Atmospheric Administration—36 laboratories, 733 professional staff, 1,330 total.

Smithsonian Institution: Main coordinating office and five branches doing environmental research with a total of 991 staff.

Department of the Interior: Eight major Bureaus, approximately 400 laboratory facilities. No estimate of total number of investigators.

Environmental Protection Agency: Contains Bureau of Air Pollution Sciences; Western Environmental Research Laboratory (for radionuclide research originally; now expanded for arid zone research); the Taft Center in Cincinnati is being maintained with broad scope; and National Center for Toxicological Research (Pine Bluff, Arkansas) is being instituted. Six air pollution laboratories at the Research Triangle, and in Ann Arbor, are being consolidated. Under the new organization there will be a total of 30 Environmental Protection Agency research laboratories with 1,100 professionals and 838 non-professional staff. In addition, there are 38 regional laboratories which sometimes conduct research. See appendix for details.

Question: What are the fields of specialization of the scientific investigators in your laboratories? What advanced degrees do they hold?

RESPONSE

Army Corps of Engineers: One Ph.D. in water quality and ecology—total of 68 Ph.D's, 128 Masters, 214 B.S.

General Services Administration: Not applicable.

National Aeronautics and Space Administration: No data provided.

Council on Environmental Quality: No data provided.

Office of Science and Technology: Not applicable.

Atomic Energy Commission: All scientific fields; 40% of scientists hold Ph.D's.

Department of Defense: Approximately 750 environmental scientists; 122 Ph.D's, 187 Masters.

Office of Emergency Preparedness: No data provided.

Tennessee Valley Authority: No Ph.D's in ecology; 29 Ph.D's and 52 Masters in various fields of science, including 11 Ph.D's in biology and forestry.

National Academy of Sciences: Consultants only.

Department of Health, Education, and Welfare: NIEHS—53 Ph.D's; FDA—not applicable, HSMHA—no data.

Department of Agriculture: ARS has 1,294 scientist-man-years in environmental research; 2730 scientist-man-years in CSRS; 753 scientist-man-years at USFS; 54 scientist-man-years at SCS.

Department of Transportation: 10 Ph.D's, 46 total scientists at TSC.

Department of Commerce: Maritime Administration—N.A.; NBS, 460 Ph.D's, 1,365 total; NOAA, 192 Ph.D's, 733 total.

Smithsonian Institution: Many branches of science. No quantitative data.

Department of the Interior: Large number of scientists: see appendix for details.

Environmental Protection Agency: Has 1,280 scientific investigators; numerous disciplines represented; no "ecologists listed per se, but 194 biologists and others closely related.

Question: What is your present level of funding for environmental research? What is your present level of authorization for environmental research? For how many years?

RESPONSES

Army Corps of Engineers: FY 1971 $1.1 million (n ilitary) +$12.4 million (civilian); FY 1972 $0.9 million (military) +$22.5 million (civilian).

General Services Administration: No data provided.

National Aeronautics and Space Administration: $175 million (FY 1971).

Council on Environmental Quality: FY 1971 $190,000; FY 1972 $565,000.

Office of Science and Technology: No data provided.

Atomic Energy Commission: $73.8 million (FY 1971); +$15 million on contract from other agencies.

Department of Defense: $65.9 million (FY 1971).

Office of Emergency Preparedness: No data provided.

Tennessee Valley Authority: $1 million; $3.5 million from EPA for research.

National Academy of Sciences: $1.8 million.

Department of Health, Education and Welfare: $1.4 from Environmental Protection Agency for the National Center for Toxicological Research; NIEHS; $20 million; HSMHA—no precise figures.

Department of Agriculture: $125.7 million.

Department of Transportation: $1.3 million and request for $2.5 million more (FY 1971); FY 1972 $15 million.

Department of Commerce: Maritime Administration $0.4 million present funding; $1.1 million authorization; for five years. NBS $3–4 million of which $0.5 million is from EPA. NOAA—$58 million (FY 1971).

Smithsonian Institution: $10.4 million.

Department of the Interior: OWRR—$19.1 million authorized, $11.6 million funded (1971 FY). OCR—$17 million. Office of Saline Water, $0.775 million. U.S. Geological Survey—$57 million +$22 million from other agencies; also $75 million for water data collection and topographic mapping. Bureau of Reclamation—$0.572million. National Park Service—$1.0 million. Bureau of Sport Fisheries and Wildlife—$9.3 million. Total funded: $119.1 million +$75 million.

Environmental Protection Agency (Fiscal year 1972 (in millions)):

	Budget request for fiscal year 1972	Authorized for fiscal year 1972
Solid waste	18.6	152.0
Water	60.6	156.3
Air	73.1	140.0
Pesticides	7.8	
Radiation	3.0	
Noise	1.2	
Toxic materials	1.0	
Total	165.3	+348.3

Question: What kinds of problems are you addressing under the category "environmental" research? What proportion of this work would you consider "basic" research, defined as research producing fundamental, theoretical knowledge which was not sought for immediate problem-solving purposes? What proportion is devoted to technology development? To technology assessment?

(See appendix for details on research programs)

RESPONSES

Army Corps of Engineers: Estimate 7 to 10% as basic research, 65% as technology development. Siltation, environmental impact of dams, dredging technology to minimize environmental impact.

General Services Administration: No data provided.

National Aeronautics and Space Administration: Includes relevance to remote sensing; weather modification; geology; atmospheric studies and noise pollution.

Council on Environmental Quality: Look for trends in environmental conditions and keep track of current status of environment and environmental policy.

Office of Science and Technology: No data provided.

Atomic Energy Commission: 28% basic, 54% applied, 18% development. Deals with radionuclide transport and effects of heated effluents.

Defense: 7% basic, 71% technological development, 8% technological assessment (Army). No basic research in Navy or Air Force.

Office of Emergency Preparedness: No data provided.

Tennessee Valley Authority: Pesticides, fertilizers, nutrients, heated effluents, effect on environmental coal pollutants; solid waste disposal; radioactive wastes from nuclear power plants, 10% basic, 30% technological development, 60% technological assessment.

National Academy of Sciences: Literature reviews; 50% technology assessment.

Health, Education and Welfare: See appendix for details; all health related.

Department of Agriculture: Large array of topics, including ecological; 35% basic, 65% technological development.

Department of Transportation: 20–19–61%, but DOT interprets "technological assessment" as assessment of "the state-of-the-art in a given technology area; aircraft air pollution; noise; emissions and new car power systems."

Department of Commerce: Maritime Administration—Disposal of wastes from vessels, spoil; 5–90–5%. National Bureau of Standards—Pollution measurement devices; standard levels of pollution; some research on effects (e.g. NTA); noise and radiation research. National Oceanic and Atmospheric Administration—45–35–20% over all media—land, air, water.

Smithsonian Institution: Virtually all basic, centered on ecology and systematics.

Department of the Interior: Wide array; see Appendix.

Environmental Protection Agency: Estimate roughly 20% basic research, 70% technology development, 10% technology assessment. An extensive description of each research project has been included,

falling under the category of: effects of pollution; transport, distribution and fate of pollutants; instrumentation and analysis; prevention and control technology; and socio-economic legal aspects. The last includes research on solid waste management; on relationship of transportation systems and urban land use to generation of air pollution; basically, elements for development of implementation plans, and criteria documents, on air pollution. Economic consequences of air pollution.

Most agencies have overestimated their "technology assessment" portion in the sense the committee intended.

Question: List your current research projects on ecosystem structure and function, if any.

RESPONSE

Corps of Engineers: None.
General Services Administration: No data provided.
National Aeronautics and Space Administration: None.
Council in Environmental Quality: None.
Office of Science and Technology: None.
Atomic Energy Commission: Extensive research at 36 institutions.
Department of Defense: 1 study on bird collisions with aircraft.
Office of Emergency Preparedness: None.
Tennessee Valley Authority: 1 or 2 simulation-model type projects.
National Academy of Sciences: No data provided.
Health, Education, and Welfare: NIEHS and EPA have a study on "potential stressors" in the environment.
Department of Agriculture: Extensive research—hundreds of projects.
Department of Transportation: None.
Department of Commerce: Maritime Administration, none. National Bureau of Standards, none. National Oceanic and Atmospheric Administration—list 12 projects, which is a sampling.
Smithsonian Institution: 2 major studies, 1 on Coral Reef, other on Chesapeake Bay.
Department of the Interior: A variety of projects are listed; see appendix.
Environmental Protection Agency: 85 projects are listed, of which a much smaller number actually involve study of organisms at the community level, in a natural setting, judging by title.

Question: How much of your environmental research is conducted at your own facilities? How much is done by contract to other institutions? Please indicate the proportion of contract work assigned to each of various types of institutions (university, independent research firm, industry etc.).

RESPONSES

Army Corps of Engineers: 40 to 99% in-house. Out-of-house research is evenly divided between universities and industry.
General Services Administration: No data provided.
National Aeronautics and Space Administration: A number of projects are shared jointly with other agencies.
Council on Environmental Quality: Relies mostly on other agencies. Contracts mostly to independent firms.
Office of Science and Technology: No data provided.

Atomic Energy Commission: 2% of Atomic Energy Commission Health and Safety Laboratory; 40% at AEC-owned laboratories; 48% at or on universities campuses; 5% contracted to other government agencies.

Department of Defense: 50% in-house; 37% at universities, 5% at independent research firms, 8% with industry.

Office of Emergency Preparedness: No data provided.

Tennessee Valley Authority: All in-house.

National Academy of Sciences: No data provided.

Department of Health, Education, and Welfare: FDA at National Center for Toxiological Research; some contracting out expected. NIH—70% as grants; 25% as contracts: to universities; 5% in-house. HSMHA—all in-house.

Department of Agriculture: 84% in-house, 15% at universities, 1% by independent research organizations.

Department of Transportation: 59% in-house; 22% interagency; 9% university, 1% non-profit corp., 9% industry.

Department of Commerce: Maritime Administration—None in-house, 90% to industry, 5% independent research firms, 5% universities. NBS—All in-house. NOAA—Varies; see appendix.

Smithsonian Institution: In-house.

Department of the Interior: Various mixes; see appendix.

Environmental Protection Agency: 32.4% of research is in-house (FY 1972), 52.1% as contracts, 15.5% as grants. Grants go to universities; contracts go to industry (27%), industrial research firms (6.6%) and other government agencies (18.4%).

Question: What mechanism, if any, do you have for identifying and addressing large-scale environmental questions by interdisciplinary terms? What mechanism do you have for coordinating your activities with the Environmental Protection Agency? Please include copies of any memoranda or letters of agreement which detail your coordination mechanism.

RESPONSES

Army Corps of Engineers: Have internal groups for planning, design, construction, operation, and maintenance and broad staff of scientists. Two EPA—Corps memos—one on Permit Program, one on water quality management planning capabilities.

General Services Administration: No data provided.

National Aeronautics and Space Administration: Share membership on boards with other agencies. Share facilities at Mississippi Test Facility. Other details not provided.

Council on Environmental Quality: Coordinates agency activities on environment, has advisory groups, interagency committees and consultants. No research facilities per se.

Office of Science and Technology: No data provided.

Atomic Energy Commission: Have national laboratories equipment for interdisciplinary studies on nuclear-radiation-thermal aspects of environmental quality, and modest facilities for other studies. Have conducted series of discussions with EPA on areas of joint interest.

Department of Defense: Interdisciplinary teams from labs/centers identify and address problems. Activities are "coordinated" with EPA, CEQ, OMB, but no formal agreements exist.

Office of Emergency Preparedness: No data provided.

Tennessee Valley Authority: Have interdisciplinary laboratory which does research contracted from EPA as well as in-house.

National Academy of Sciences: Panels, symposia, workshops, committees address problems by interdisciplinary teams, through literature review. No formal mechanisms of interagency coordination, but active informal contact.

Health, Education, and Welfare: EPA and FDA in HEW jointly sit on policy board of National Center for Toxicological Research which conducts research on topics relevant to both agencies.

Department of Agriculture: USDA has a Coordinator for Environmental Quality, sits on interagency panels, prepares 102 statements. FS, SCS, ARS and CSRS conduct interdisciplinary research, includint social scientists.

Department of Transportation: Aircraft Noise Abatement program has interagency cooperation; Highway office has in-house landscape architects, plus coordination with DI, HUD, USDA, and EPA.

Department of Commerce: Maritime Administration—Interagency cooperation includes use of NAPCC. National Bureau of Standards—No large-scale investigations, but informal interagency contact and physical-chemical discipline interaction. National Oceanic and Atmospheric Administration—A variety of interagency coordination activities and in-house research (not detailed). Also operate Federal Services on meteorology and marine environmental prediction.

Smithsonian Institution: No large-scale environmental questions addressed, though interdisciplinary occurs in lab. units.

Department of the Interior: Department's office of the Science Adviser, coordinates 21 multi-agency groups. Appendix details interdisciplinary research (scientific) within department.

Environmental Protection Agency: Regional research and monitoring representatives keep liaison with local problems for identifying large-scale problems. Uses special committees, panels, including Hazardous Materials Committee. Also EPA interactions exist with FDA (NCTR); HEW (NIEHS), DI (Environmental Review Board), USDA. Developing data bank for interaction with other Federal agencies. Extensive information on interagency interfaces included.

Question: What important questions, if any, are you unable to research adequately within your existing research structure? What are the main hindrances to proceeding with such research?

Army Corps of Engineers: Lack baseline environmental data and some means of converting data from other disciplines with technological requirements. Also need better ways of quantifying environmental value in order to do cost-benefit analyses.

General Services Administration: No data provided.

National Aeronautics and Space Administration: No answer.

Council on Environmental Quality: Not applicable.

Office of Science and Technology: No data provided.

Atomic Energy Commission: Lack of social science capability; lack of clear statutory authority to conduct other than nuclear-oriented activities.

Department of Defense: No data provided.

Office of Emergency Preparedness: No data provided.

Tennessee Valley Authority: Lack of funds prevent working on problems such as SO_2 emission reduction from fossil-fuel plants; solid

waste recycling; effects of thermal discharges from power plants on water bodies; strip mine reclamation; agricultural pollution; industrial pollution, which TVA feels it could otherwise perform.

National Academy of Sciences: No answer.

Department of Health, Education, and Welfare: FDA—low dose exposure to toxics; too little known, and understaffed. Hope National Center for Toxiological Research will rectify this. NIH—none. HSMHA—only limitation in funding.

Department of Agriculture: List ten major projects not being addressed, but ascribe failure to lack of funds and personnel rather than to research structure.

Department of Transportation: None.

Department of Commerce: Maritime Administration—Baseline data on oil and hydrocarbons in ocean needed. Suggest this could be done by NOAA. NBS—Most current environmental funds are derived from reprograming. Feel they have under utilized personnel and lack of funds. NOAA—Coastal zone management, cite inadequate staffing and laboratory facilities for this. Global monitoring of atmosphere—inadequate funding; weather modification studies needed.

Smithsonian Institution: Inadequate funding, space and personnel.

Department of the Interior: General theme of comments is need for more research on (1) what is a "baseline" clean environment, including population dynamics of animals, etc. (2) impact of pollution stresses on wildlife, land, etc. Need funds rather than restructuring.

Environmental Protection Agency: None.

NOTE. "Appendix" refers to part II of the 1971 hearing record on NEL's.

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